

WHAT IS CLIMATE CHANGE?

Changes in the Earth's **climate**, due to human activities – also known as **anthropogenic climate** change, or natural processes that are already occurring or predicted to occur. These include increasing air and sea surface temperatures, changing rainfall patterns, **sea level rise**, ocean **acidification**, and changes in frequency and intensity of extreme events such as **droughts**, **floods** and tropical **cyclones**. **Anthropogenic** climate change is expected to happen much more rapidly than natural changes in the **climate**, posing an enormous challenge to both natural and human systems. Climate is the long-term description of the weather, usually over at least 30 years, in terms of variables such as temperature, rain and wind. *This definition is from the **Pacific Climate Change Portal Glossary** which also contains much more information on climate change.*

CLIMATE CHANGE VS GLOBAL WARMING?¹

These terms are often used interchangeably however there are differences. Global Warming is viewed as an overall warming of the planet based on average temperature over the entire surface and climate change are changes in regional climate characteristics over a long period, including temperature, humidity, rainfall, wind and severe weather events.

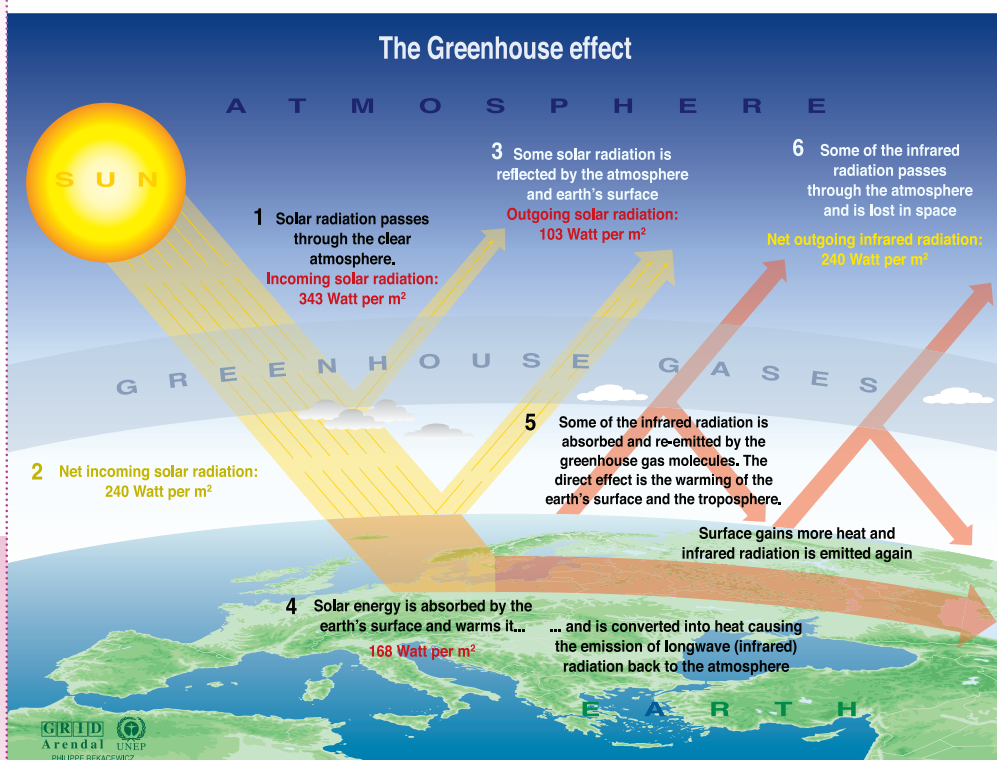
1 Grinning Planet. 2007. www.grinningplanet.com/2007/01-02/global-warming-vs-climate-change.htm. Retrieved from the internet May, 2014. Difference Between. com. 2012. www.differencebetween.com/difference-between-climate-change-and-global-warming/ Retrieved from the internet May, 2014.

SO, WHAT CAUSES CLIMATE CHANGE?

Energy from the sun drives the Earth's weather and climate, by heating the Earth's surface. To balance this, the Earth radiates energy back into space.

Atmospheric gases such as water vapour and carbon dioxide (CO₂) trap some of the outgoing energy, so the Earth retains more heat than it would without the atmosphere.

If it were not for this natural "greenhouse effect", the Earth's temperature would be much lower than it is now and life as we know it today would not be possible.



Sources: Okanagan university college in Canada, Department of geography, University of Oxford, school of geography; United States Environmental Protection Agency (EPA), Washington; Climate change 1995, The science of climate change, contribution of working group 1 to the second assessment report of the intergovernmental panel on climate change, UNEP and WMO, Cambridge university press, 1996.

Climate has always changed due to natural processes interacting with the sun such as the water and energy cycles. In the past these changes were natural and caused by phenomena such as slow shifts in the Earth's orbit and changes in solar and volcanic activity. However, human activity has caused a sudden shift in the climate by releasing billions of tonnes of carbon dioxide (CO₂) into the atmosphere and adding substantially to the greenhouse effect.

Greenhouse Gas (GHG) emissions have increased rapidly since the industrial revolution in the 1800's, and reached their highest level in the decade to 2010².

2 IPCC, 2014: Working Group 3, Assessment Report 5, Ch 5: p4

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The basic needs of fast growing populations – such as food, shelter and drinking water – are also placing additional pressure on Earth's resources. Coupled with climate change, these pressures will make it harder for many people to adapt to the impacts of climate change in future.

There has been a marked increase in the global surface temperature of nearly one degree (0.89°C) between 1901– 2012³. This warming has led to other changes including alterations in cloud patterns, snow cover, rainfall, wind patterns, ocean currents, and the distribution of plant and animal species.

While a change of only one degree may sound like a very small change, this level of change is already having a marked impact upon the global climate systems. If global temperatures were to rise to up to 2°C, many coral reef ecosystems and climate sensitive species could be permanently lost⁴. Just as the human body cannot cope with a sustained temperature rise of over two degrees, nor can many of our natural ecosystems.

Just over a quarter of the carbon dioxide produced by human activity is absorbed by the ocean, making it more acidic. Ocean acidification threatens the existence of coral reef ecosystems and marine wildlife. Our forest ecosystems also absorb and store carbon dioxide, and both forests and oceans are sometimes referred to as carbon sinks.

REFLECTIONS ON POSSIBLE NEWS ITEMS

- **People in your community:** how are they being affected by climate change and what types of impacts are they observing? How are they responding to the impacts of climate change and what other help do they need?
- **Greenhouse gases:** What is the most common greenhouse gas your country emits, that contributes to the global climate change problem?
- **Protecting our environment:** How can you protect the carbon sinks in your country that helps to take carbon out of the atmosphere and slow down the impacts of climate change and global warming?

If you visit the [Pacific Climate Change Portal](#) you can find a range of information on climate change, including country profiles, news and events. The [Pacific Climate Change Science website](#) also has country specific brochures that present information about the past, current and future climate of Pacific countries. Other websites of interest that you can research to find more information for your news items include the [IPCC Fifth Assessment Report](#) and the [Secretariat of the Pacific Regional Environment Programme \(SPREP\) website](#).

3 Summary of IPCC Assessment Report 5, Working Group I (The Physical Science Basis) for Pacific COP Negotiators, SPREP, Apia, 2014: p4.

4 IPCC, AR4, Climate Change 2007, Working Group II, Ch 19: p792.



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IS HUMAN-INDUCED CLIMATE CHANGE A SCIENTIFIC FACT?

Yes. The Fifth Assessment Report (AR5) from the IPCC shows global temperatures will continue to warm many centuries after atmospheric CO₂ is stabilised⁵. By 2100, temperatures are projected to rise by 0.3°C to 4.8°C⁶ – enough to drive major changes in nature and human activity. The impacts of climate change are already prompting grave concern by governments and communities in the Pacific, and elsewhere.

The IPCC assesses all information related to the issue of climate change and publishes these in *Assessment Reports* – the latest report is the fifth in the series known commonly as IPCC AR5.

5 Ibid.

6 Ibid p5

GREENHOUSE GASES

According to a factsheet developed by the UNFCCC, six greenhouse gases covered by the United Nations Framework Convention on Climate Change and its Kyoto Protocol are:

Carbon Dioxide CO₂ – the consumption of energy from burning fossil fuels and deforestation

Methane CH₄ – from agricultural activities, energy production, waste

Nitrous oxide N₂O – mainly from agricultural activities

Hydrofluorocarbons (HFCs) – used as replacements for ozone-depleting substances

Sulphur hexafluoride (SF₆) – used in some industrial processes and in electric equipment

For more on this, refer to the UNFCCC factsheet titled '[The need for mitigation](#)'. More information on the UNFCCC will be provided in a factsheet as part of this toolkit.

